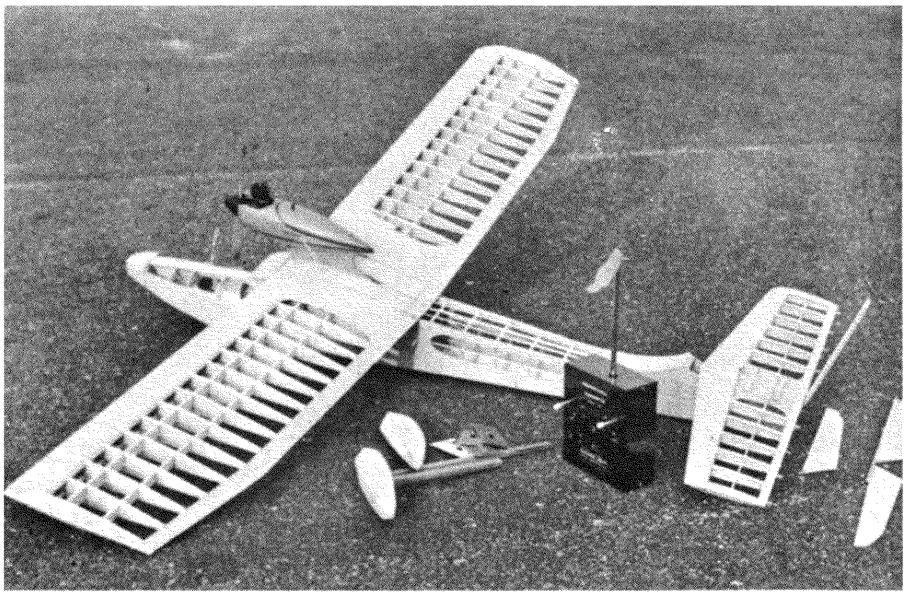
"PIRANHA"

Radio Flying Boat

PART I: How to build the thing . . .

Next month: Whatever be its fate on the high seas . . . You gotta gamble a little bit!

by Don McGovern



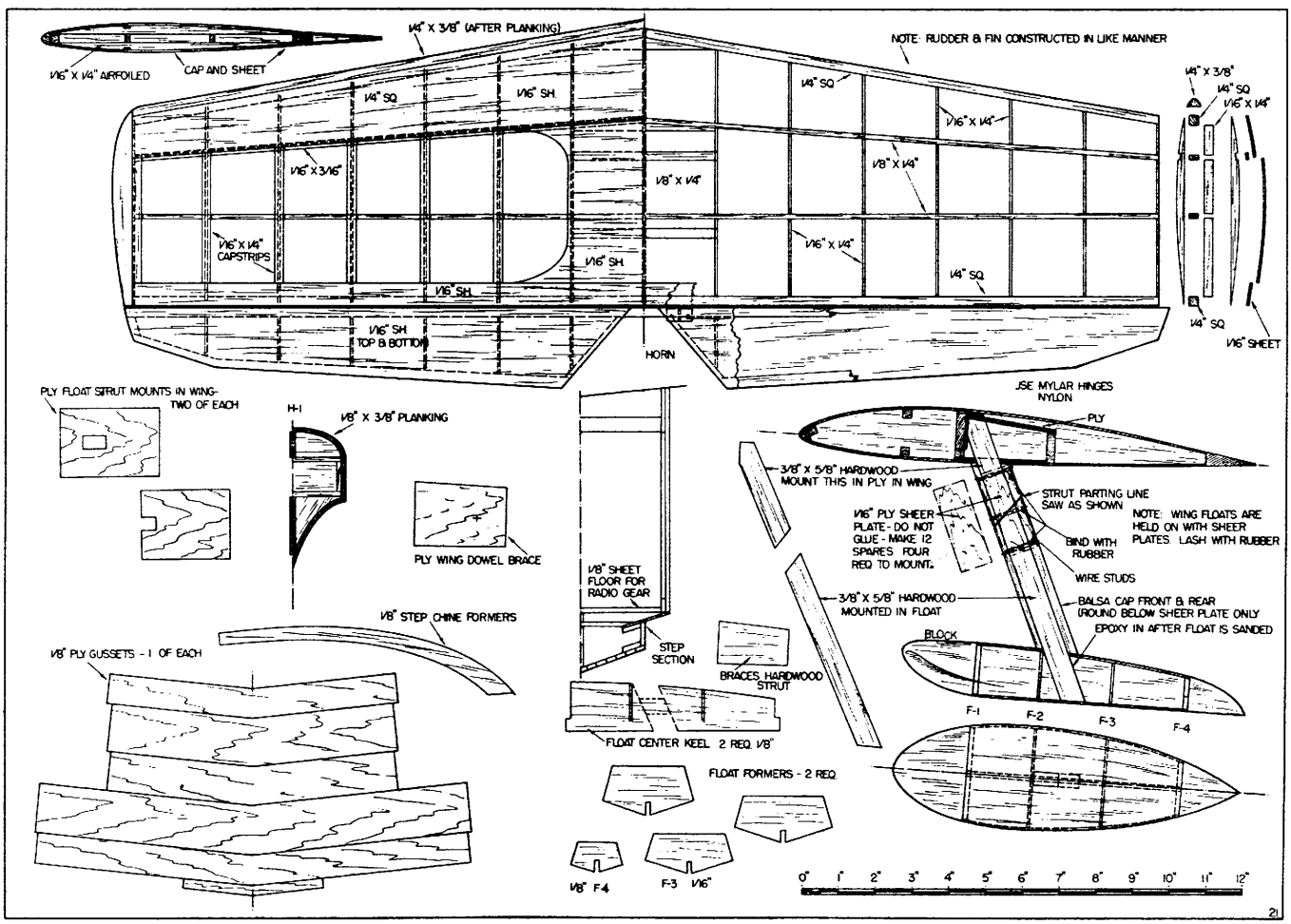
♦ That cute little South American river fish and this designer have one thing in common. We've both got a "big mouth." His, designed the better to bite you with, while mine is more prone to blab off about how I'll get a new seaplane built in time for the 1st Annual New England Hydro Championships, a near impossible task.

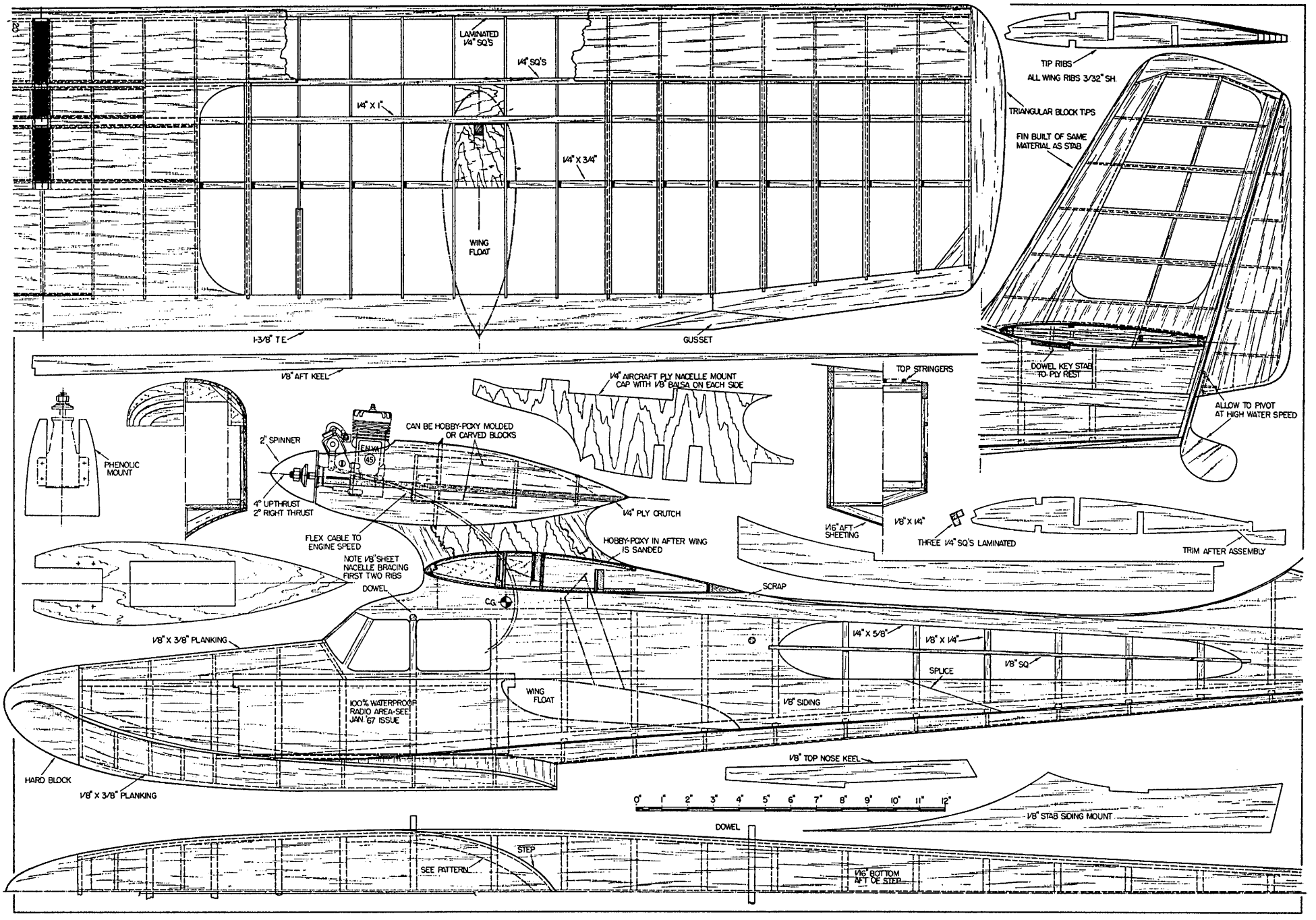
The date draws near, and like every other modeler, I'm far behind where I'd like to be in building the design. The trouble is seaplanes take a lot of figuring. They differ from the land craft in that the radio must be waterproofed,

(Continued on Page 30)

A descendant of the "Privateer" series, the "Scavenger" and "Navigator." A "just right" size for modern multi-channel radio, packs adequate power for water take-offs. We're aiming at action water photos in January issue next. The time to build is now . . . with spring weather to greet it completed. Have at it.

74" Long Planing Hull Flying Boat- for Class II, Class III equipment. Rudder . . . Engine Speed . . . Elevator Citizenship Digital installed utilizing three servos. An Enya .45 T.V.




LAMINATED 1/4" SQ'S
1/4" SQ'S
1/4" X 1"
1/4" X 3/4"
WING FLOAT
1-3/8" T.E.
GUSSET
TIP RIBS
ALL WING RIBS 3/32" SH.
TRIANGULAR BLOCK TIPS
FIN BUILT OF SAME MATERIAL AS STAB
DOWEL KEY STAB TO PLY REST
ALLOW TO PIVOT AT HIGH WATER SPEED
1/8" AFT KEEL
1/4" AIRCRAFT PLY NACELLE MOUNT CAP WITH 1/8" BALSA ON EACH SIDE
TOP STRINGERS
PHENOLIC MOUNT
2" SPINNER
CAN BE HOBBY-POXY MOLDED OR CARVED BLOCKS
4° UPTHRUST
2° RIGHT THRUST
1/4" PLY CRUTCH
1/16" AFT SHEETING
1/8" X 1/4"
THREE 1/4" SQ'S LAMINATED
TRIM AFTER ASSEMBLY
FLEX CABLE TO ENGINE SPEED
HOBBY-POXY IN AFTER WING IS SANDED
NOTE 1/8" SHEET NACELLE BRACING FIRST TWO RIBS
DOWEL
C.G.
SCRAP
1/8" X 3/8" PLANKING
1/4" X 5/8"
1/8" X 1/4"
1/8" SQ.
SPLICE
WING FLOAT
100% WATERPROOF RADIO AREA-SEE JAN. '67 ISSUE
1/8" SIDING
1/8" TOP NOSE KEEL
HARD BLOCK
1/8" X 3/8" PLANKING
0" 1" 2" 3" 4" 5" 6" 7" 8" 9" 10" 11" 12"
1/8" STAB SIDING MOUNT
DOWEL
STEP
SEE PATTERN
1/16" BOTTOM AFT OF STEP

the engine mounted in a nacelle, the aircraft stabilized on the water with multiple floats, and the hull designed to fly in two mediums, air and water. The finish must be highly doped, the wing well stressed, and everything in the way of mechanical details operating flawlessly.

The "Piranha" design spans just about 74", requires, rudder, elevator and engine speed control. Originally laid out for Citizen-Ship Analog Proportional equipment, a last minute switch to the new Citizen-Ship "Digital" proportional equipment was made. The design does not need aileron control as it was not primarily designed for stunt pattern flying, but those who wish to modify it for ailerons or other control functions will find the aircraft large enough to take the installation necessary.

Few seaplanes are ever built, yet there is a tremendous interest in them. Flyers naturally find the idea exciting, yet fear the consequences of dunking expensive radio equipment. This is a darn good point, and we have a wonderfully easy solution to this whole problem. A water-tight, weatherproof, dust-proof sealed container for everything electronic that permits your entire radio system to be immersed under water without damage . . . and it includes pushrod connections, switch and what-all. This designed by Gene Rogers, and a "must" for every R/C flyer . . . even if you fly in the middle of the desert. It is as good protection for the land flyer as it is for salt water seaplane use. Dust and grit in your servos don't help reliability a bit, not to mention the protection it offers land craft that might end up accidentally in a pond, stream or rainstorm. This "All-Dry" Canister is very simple to build, can be switched from model to model and is something you don't want to miss. It will be presented in plan form in the next issue. So, fear not for your Radio equipment. Frame out your "Piranha", and look for this special feature article on the waterproof R/C installation in one month's time. It will fit this ship.

The "Piranha" has a lot of ancestors, dating back over a quarter century of seaplane flying. Most well known of these is the "Privateer" series, from the 36" span sponson equipped version to the giant 9½ foot "Custom Privateer". This was followed with a 60" "Super .15" version, then the "Scavenger" and the "Navigator", originally an F.M. design, June-July 1963 and now a Jetco kit. This six-footer is the latest, sized to house up to multi-engine equipment and fly with the modern .45 to .56 mills available. (.35 power will fly the ship via hand launch route.) It will swing a 13" prop should you wish for .60 power, but we feel a .45 is adequate. The big "Privateer's" lift off water grossing 14 lbs. with a .60, so no need to go quite that high.

Why a flying boat? Why not a twin float configuration? These are commonly asked questions of modelers who ponder their own entry into the world of water. Both types are quite successful but this designer has flown both extensively, and has found the Flying Boat type superior in many ways. It is designed from the keel up as a seaplane, while a twin float ship is actually a conversion of a land type, and less than ideal in several respects. The flying boat has a longer, larger hull which takes rougher water in its stride, offers more room for radio equipment, and almost never flips over on touchdown. It tends to keep the engine dry, even guards it against spray in the prop, and in general is more consistent in its take-off ability.

The twin float type has its merits too, and do not feel that these types are unsuitable. The "Gee Bee" float line currently on the market has done much to engineer out any shortcomings of twin float aircraft. They are very versatile, taking off grass, sand, water, ice or snow, and landing on same. Their large size handles reasonably rough water quite well, and they readily attach to almost any multi R/C or free-flight of your choosing. While twin floats on any aircraft give it a cumbersome look aerodynamically speaking, R/C aircraft are not duly restricted in their performance with floats attached. We witnessed Gene Rogers outside-looping his "Kobra" with Gee-Bee floats just yesterday, then shooting touch and goes on a rocky sandy strip of inland terrain. Both types then have their merits, and you will probably end up flying both sooner or later. Seaplanes have advanced in design to the point where they are very thrilling to fly, and take-off and land consistently on the floats without dunking. Radio keeps them near shore, so even the boating problem is lessened. We hope you'll give them a try.

As we started to say, this is sort of a "hurry-up" design intended for a fall meet. Sort of a last chance to have fun before the stupid winter descends upon us. Just a few more days to go, and so much to build. Thus, the fastest good structure is our aim on this model, which sort of fits in with what most modelers want anyway. At this writing it will be a miracle if the ship is floating at Brimfield Dam come Sunday, but it's fun to try. Will be there in any event and shoot up some film on the fun. Look for these come next issue if they don't make it here. Doubt if we'll do much good up there anyway, as even if the ship is completed at the appointed hour, it will probably be plagued with the usual fleet of new aircraft problems to keep it grounded. Will try to include the action shots of whatever be its fate in an issue to come, 'cause right now we can only envision it roaring off in a cloud of spray and foam, rising majestically into the blue, screaming across the sky to the wonderment of all, and finally settling in for a dramatic touchdown on the step to the applause of ten thousand cheering spectators . . .

More likely, it will succumb to the usual ailments. Beset upon by irritated swans, sunk, burnt to the waterline, or lodged in the dam's overflow pipe which ends up wiping out the town. Only time will tell, but nothing ever goes quite right. It's a rare meet that doesn't leave you with some kind of scar on the memory. Like the day I impaled a ship on the "Stop" sign. Sliced into the wing clear to the trailing edge and held the ship in its perfect gliding attitude. It just quivered. I hate "Stop" signs.

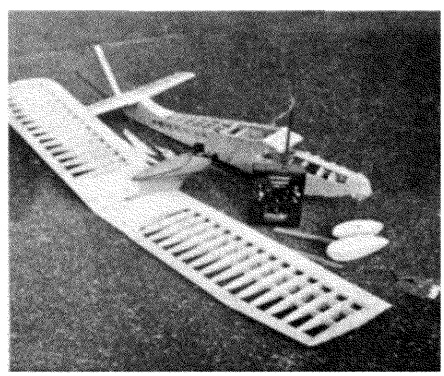
So you write to Dale for a set of plans, 'cause he has 'em and you don't. Then you stick the parts together. Afterwards you wrap it and float it. Simple as that. (That will satisfy half the readers that write in as to how boring it gets being instructed on the assembly procedure which they already know.)

For the rest, a few more details perhaps . . .

Wing Assembly: Semi-symmetrical in airfoil, ruggedly built to withstand moderate maneuvers, and the limp-covering conditions that tend to be the rule of a seaplane at the sea. It is not wise to rely on skin tension on a seaplane, as the covering relaxes just a speck while at the beach, tightening back again as it returns to a drier climate. Ribs are closely spaced, cap-stripped and the leading edge sheeted. Spar notches are just a little deeper than the wood size to recess them further below the covering to prevent adhesions from the sag of the silk between ribs. Tips are of triangular block, and ⅛" ply gussets strengthen the wing center.

A single rib pattern will suffice, with just a little trimming down of the ribs toward the wing tip as the trailing edge starts its taper. The nacelle is

(Continued on Page 34)



Wing well lashed with spars, ample ribs, beefy but light. Sheeted, capstripped, ample gussets.

Nacelle slips into center slot after wing is assembled, sheeted, sanded. Hobby-Poxy does it.

Tip floats assemble easily from patterns. The grain of siding runs vertically, top sheeting spanwise on these floats for assembly ease. A block front and back. Hardwood struts slip in.

ruggedly mounted as detailed, and mount areas should be well braced and secured prior to applying sheet planking, etc.

Stabilizer: The basic frame is first laid out flat on the plan of ¼" stock as specified on the plan call-outs. Later the ribs are capped top and bottom and trimmed to a symmetrical airfoil section. The plan will clarify this construction technique. No ribs as such need be cut from patterns with this method, yet you end up with a lightweight, airfoiled stab.

The Hull: Two ⅛" sheet sides form the main structure. We suggest you trace accurate patterns off the side view of the plan on tracing vellum, then rubber cement these directly onto balsa sheet. Cut to the exact outline as required, then peel off the paper pattern. Rubber cement may then be rubbed off easily, without any trace of it remaining on the balsa. A small lump of dried rubber cement is very effective in removing all traces of the cement, much as chewing gum adheres to itself. A can of rubber cement is a very worthwhile addition to your workshop, and applies with a small brush often found within the can cap. Better yet, purchase a rubber cement dispensing jar from any art store.

Once the sheeting is cemented together forming the basic siding, the upper ¼" x ⅝" longeron strip is added, as well as the lower reinforcing ⅛" x ⅜", the side stringer and ⅛" x ¼" uprights.

Once one fuselage side is completed and dried sufficiently, remove from the plan, and lay out the second side against the outer face of the first. A sheet of wax paper should separate them to prevent cement smear adhesions.

Assemble the second side in much the same manner, pin-pricking or pencil marking the upright reinforcement positions where not visible through the sheeting. With one side assembled over the other in this fashion, the aircraft ends up with two identical sides, a big help when it comes to trying to align all. Once dry, remove the sides and clear the bench for the next operation.

Trace off the patterns for the floor of the radio area and the lower keel pieces. Rubber cement the patterns to ⅛" sheet, cut to shape and peel off the paper remaining. Rub rubber cement free of the stock. Next, a temporary ⅛" balsa former is cut to shape to fit the widest point in the fuselage at bulkhead #7. This is then cemented to one side, carefully aligned. A similar temporary former of the same width is positioned near the aft end. It will only be used to hold the sides parallel for a half hour while the cement sets.

A ⅛" sheet nose former for bulkhead #1 is now cut to shape and cemented in position. Pull the siding together toward the nose with a heavy rubber band or so. Align carefully, and sight the structure constantly at this stage. Aim at equal bowing of the siding at all times, adjusting toward the rear as need be by pulling one side or the other a tiny amount.

The temporary aft former holding siding parallel may now be removed, and the sides cemented together at the extreme rear, with a ⅛" x ¼" spacer at that position. This will give adequate width to the rear of the hull to give access to the pushrods and such. The sides are cemented together at the aft end at this point, with pins and a rubber band holding them in position. Sight from above and lengthwise to assure an even bowing as mentioned before. This is most important and easy to correct at this time.

The radio compartment ⅛" sheet flooring is the next chunk of stuff to go into place. Center it carefully on the bulkhead #7, meeting the chine edge of the sheeting just ⅜" forward of bulkhead #3. The siding must be spread apart to accept this sheeting with some small effort, and it is wise to share the load with a few ⅛" x ¼" crosspieces, as the grain of the sheeting will permit it to bow under the pressure of the siding.

Once this is shored up, test fit the ⅛" sheet bottom nose keel in place. Notch as necessary to pass the crosspieces. and note the keel swings up to the top edge of the siding between bulkheads #1 and #3. Align carefully and sight it aft to see if the keel aims straight toward the rear of the hull.

The top keel from the nose block aft to the windshield is now cut out and cemented in place. Cut out the plywood dashboard panel former and cement in place at the inclined angle. Note that it is notched for clearance of the removable R/C compartment box (to be detailed in the next issue) and permits the R/C gear to be removed easily through the cabin opening when the wing is removed. It should be pointed out that the R/C package will vary in size with the equipment used. Ours to house the Citizenship Digital system, using three servos fits within a 2⅝" wide by 3 1/16" high by 10½" long box . . . plus outer mounting rails and protruding fittings. Find the most compact arrangement you can pack your particular brand of equipment into and stand by for plans of the waterproofing deal to come in the following issue. It'll take you that long anyway to get a plan and frame the cotton picker up.

Once you reach this point, the remaining hull structure becomes obvious. The balance of the nose formers are cemented in place one by one, and the triangular bottom hull formers aft of the step make ready for the 1/16" aft bottom hull sheeting.

This aft bottom sheeting (1/16" thick. med. hard) should be carefully test fitted, then cemented in place, travelling up forward of the step to the outline visible on the top hull view, to where it meets the siding. Cement the sheeting in place, meeting in a "V" at keel. Trim the siding a speck here or there to keep the thing from leaking like a derelict if nothing else.

Forward of the step you start the fun. Cut four curved step formers, as visible in the top hull view. Goo up two of these and cement them onto the bottom aft sheeting. Cement the remaining two onto former notches, directly above the first pair.

The formers forward of the step gradually increase their angle from 18 degrees at the step to who knows what toward the bow. It takes on a sweeping flair toward the bow, giving you a lonely concave curve to plank. It looks nice in its finished state, but it is a real pig to build. Plank your way around it in narrow strips (⅛" x ⅜" or less) as conditions dictate. It is tough going for a few strips, and any way you can mash them together is legal. Later they all sand smooth if it is a solid spread of balsa without open cracks. Apply a skin of epoxy cement etc. to reinforce it. While we're on the subject, it is tough to cover it too, requires silk to be well seated in clear dope, then kept in place while drying to avoid bridging over. Nothing too difficult, but exercise care at all times in the bottom forward hull flair area.

As our ship will never see land, we have not done anything extra to guard the hull bottom other than sheet and silk, plus a wire strip along the keel. (In sections to avoid aerial effects.)

If you would like to do any land flying with the design, we suggest a few layers of fiberglass on the bottom forward hull area, plus a small nose wheel and pair of main wheels set just aft of the step. This trike gear arrangement will work reasonably well, but our advice is to keep the ship strictly as a seaplane and avoid the temptation to fly on land. It sort of opens up the seams and creates leaks etc.

A few extra coats of dope on the frame of the hull will pay off in a longer life of the aircraft. If you have access to a paint sprayer of any type, try to spray the inner hull structure with a few coats of clear. At least brush on a coat or two if a sprayer is not available. The same applies to the wing floats, nacelle, wing and stab tips. These areas are in contact with the water more than others if the model dunks.

Brace your windshield as never before. A normal installation of the celluloid is not adequate on a seaplane. If the model enters the water in a stalling/diving manner, the water will punch the windshield in as if it was a hammer. Brace it with balsa as detailed. ⅛" plexiglass was on hand for the original, and this does a beautiful job, though hard to work with. The windows were scribed onto the plexiglass, then cut

out with a jig-saw, pressed in place. Celluloid is quite suitable however when reinforced as shown.

Engine Nacelle: This is lots of fun. A ¼" thick piece of aircraft ply forms the mount, capped on each side with ⅛" sheet balsa. Hobby-Poxy cement is useful for this laminating task. This ply and balsa mount is jigsawed to the pattern to slip into the wing between the center ribs of ply. ⅛" sheeting or planking strips reinforce the ply ribs, resting on undercut balsa ribs. This really boxes in the nacelle mount solidly.

The top profile center core of the nacelle is of ¼" aircraft plywood, with block balsa above and below. These are carved to a circular cross-section, hollowed as necessary for the 6 ounce fuel tank etc. The original intent was to mold major portions of the nacelle with the Hobby-Poxy balloon method, but the time schedule of the moment altered this in favor of a less durable, less attractive balsa facsimile. The cowl to enclose the engine crankcase area will still be molded with the Hobby-Poxy method at the earliest opportunity.

Note the engine is mounted on a separate plate for easier removal and thrust adjustment. ⅛" thick laminated phenolic (micarta) board was used for this, which is extremely tough, durable and impervious to the fuel drippings. Mount the engine with elastic stop nuts, or with the nuts secured to a plate to prevent accidental loosening.

Trim and sand the entire nacelle complex smooth. The ⅛" capping of balsa on either side of the nacelle mount makes it a simple matter to trim this to a pleasing rounded shape.

Elevator: Only a small degree of elevator control was deemed desirable for our personal needs, and the width of the surface was therefore kept to a minimum. You may wish to increase this somewhat if stunt flying is your dish. We were looking for more trim control than stunt-ability. Just enough to flair out or lift-off. All hinges should be of rust-proof design, which makes nylon strip or fishline types ideal.

Wing Float Mounts: The wing must be supported by the floats and attaching struts to keep the crate from listing fearfully. It is a fact of life that the floats will be severely yanked and twisted by various wave conditions encountered, as well as an assortment of bruises as you catch them on the side of the boat or whatever. All of which adds up to potential damage to the float, the mounting struts and possibly serious damage to the wing and covering.

To avoid such damage, the wing floats are made removable, held in accurate alignment by sheer plates and rubber bands. 1/16" ply rectangles form a splint on each side of the strut, then bound tight with rubber. Thus the float can pivot rearward, forward, to left or right, or any combination of directions much the same as a ball socket joint.

Given a rough water landing, if a wave strikes one float, it may pivot back, snap the ply sheer plates, and pull completely off the model. The "Piranha" will continue its landing run, not even falling on its wingtip, as the loss of the weight of the float makes the aircraft rest on the opposite float instead, as on an outrigger canoe. Needless to say, you should carry a dozen spare ply rectangles to replace any lost in the days flying. This system is well tested, works beautifully, and tension is easily varied as you see fit with additional rubber bands.

Two other side advantages of this mounting system . . . the wing is easier to transport with just the mating stub of the strut protruding, and the aircraft can serve double duty as a landplane at any time with the wing floats removed.

Stab Mount: Note the stab has been lifted as high as is practical over the hull, to keep it clear of the water and take-off spray. It is quite solidly mounted when built as detailed on the plan. Key the surface to prevent any shifting, particularly in view of the fact the rudder would shift with the stab if it moved at all. This would cause trouble.

Wing Floats: These are quite easy to build up, "V" bottomed as per formers shown, block tips fore and aft, all sanded smooth. Note the hardwood struts lock into the floats solidly. The wing floats should just barely contact the water with the plane at rest. Just enough to hold the aircraft level and true. Full scale flying boats are designed to rest on one or the other, but on a model this tends to cause uncontrollable circling on the water. Hard to get it balanced without a pilot in the cabin to stabilize it with aileron pressure. Make them to the length shown, then shave them a speck shorter as flight tests indicate. Each ship varies a little in loading, degree of dihedral and such.

Covering: We recommend silk, but other material will do quite well. Mono-Kote seems to have many advantages for seaplanes, in that it is quite water repellant in addition to being easy to apply. Silkspan will hold up quite well also, but we would recommend double covering some areas. Silkspan plus Jap tissue makes a good combination.

Use more than enough clear dope. The surfaces should be well doped to a high gloss to make it watertight. Use fuel-proof butyrate, with perhaps a few drops of castor oil in the dope to avoid warping.

Pin-prick air vent holes between each rib at the trailing edge. This is important with a highly doped surface. The heat of the sun in the warmer weather can bloat the covering and even burst it. Also, it allows you to drain the few drops of water which will collect between ribs after dunking a tip. Blowing in the top pin hole will force water out the bottom if the wing is held at the proper angle. ●

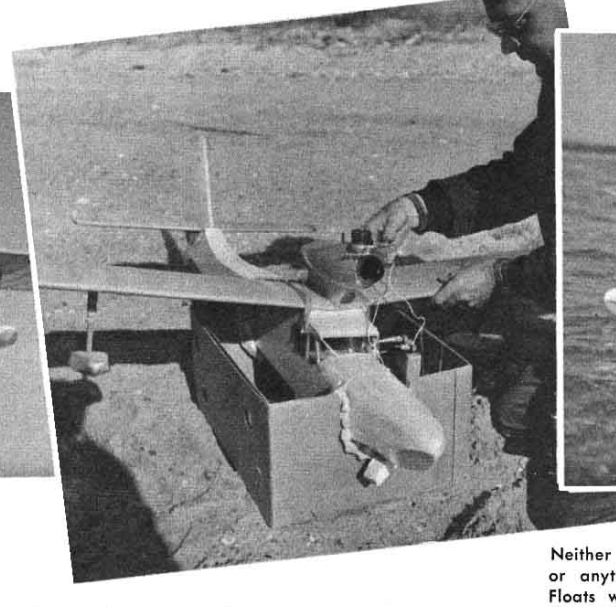
Next month:

PART II: How to fly the thing . . .

We're aiming at action water photos in January issue next. The time to build is now.

Also:

100% waterproof R/C installation



Neither wind nor rain, tidal waves, bog, plague or anything else shall deter this soggy hulk. Floats were set a fraction too deep for these first trials, mounted loosely to lessen stress etc. Thus they plowed along, pulling loose on take-off attempts. They will do fine however.

Almost finished with yours? Take it drown to the shore.

...Sea the nice "PIRANHA"

74" Citizen-Ship Digital Flying Boat (plans in preceeding Dec. '66 issue)

Part II "PIRANHA'S" FUNERAL: ... that is, you can watch the wake.

by Don McGovern

◆ **The December issue** of F.M. has all sorts of plan drawings and text for this nautical gem, although by the time you finish sticking together the thousand-odd parts, you may chose to call it something else. Technically, it's the "Piranha," an outsized Flying Boat for Class II and Class III R/C equipment, and we're up to the flight test stage.

William Aarts in Holland inspired our "Piranha" with his flow of letters across the Atlantic. Flew in with a load of horses the night before these flight trials, so it was nice to have him help us wreck it. Aarts is KLM Dutch Airlines pilot, active in Hydro R/C, flies our earlier "Scavenger" design, similar to this modern version. His ship is taking off with a .45 with a 146 ounce gross tag on it. Span is also 6 ft.

The ship is six-foot-two in span, and houses Citizen-Ship Digital with three servos actuating the rudder, elevators and engine speed. Ailerons and auxiliary controls could be added at the builders option, but as the design is more for seaplane use than pattern flying, it was decided to omit these frills in favor of a lighter wing loading for more consistent water take-offs.

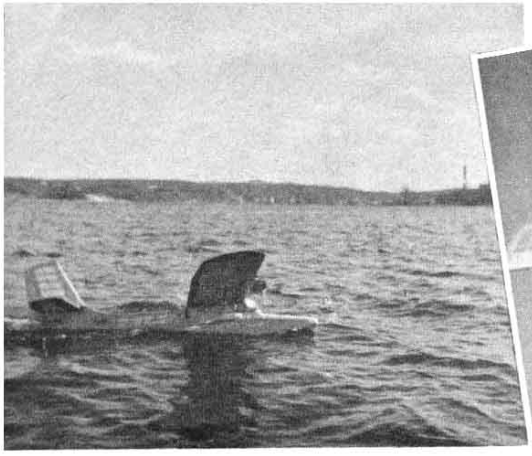
The 74" span was chosen as the most practical size for a .45 aircraft, with a possibility of reducing test power to a .35, or increasing to a .56 or .60. It is ideal in that the wing area would easily support the weight of the waterproof R/C equipment, provide a large enough forward hull compartment to receive the radio, and offers a reasonably adequate nacelle cubic volume for the desired 6 ounce fuel tank. Also, the bigger a seaplane is, the more it can cope with small waves, particularly important on the more exposed bodies of water.

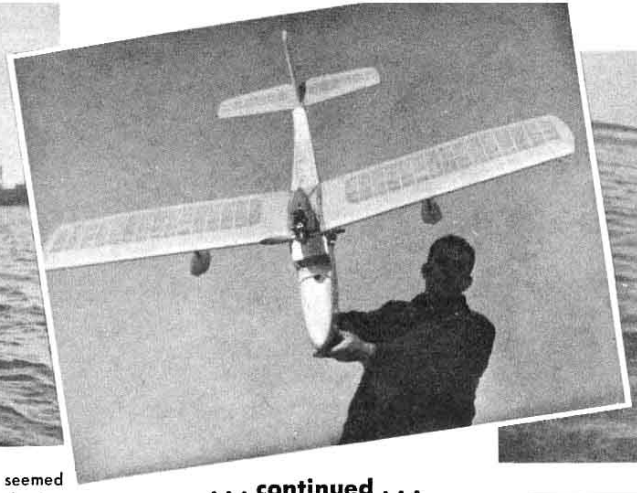
We suggest you pour plenty of effort into the completion of the aircraft, with particular attention to adequate doping to a high gloss, waxing and waterproofing of the radio equipment. Gene Rogers designed the "All Dry Canister" around this aircraft, and plans and descriptive text appears in this same issue. It is noteworthy in that it is extremely simple to build, turns your entire radio system into a single removable unit, and effectively and visibly seals out the water, even around the pushrods.

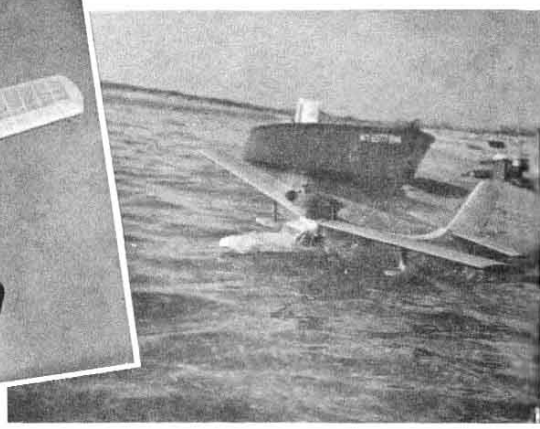
Test all controls, engine thrust, warps and button-pushing operations at home to lessen the problems, at the beach, 'cause enough problems will crop up at the shore without adding unnecessary ones.

It proved slightly maddening to com-

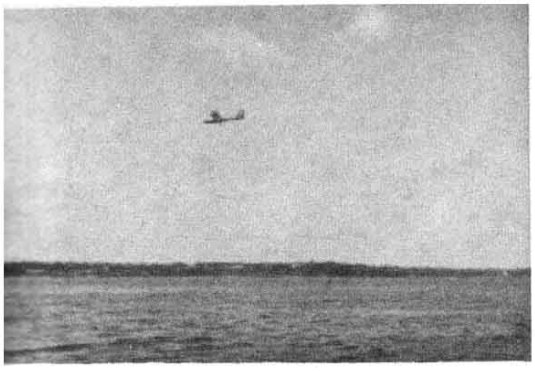
Gene Rogers on hand with boat, pipe, tools, aid and heckling. Designed the waterproof R/C system for the ship which kept it dry as a bone, a lot safer in the smack-up. No harm came to it. No major changes seem indicated from initial tests. Just normal trim corrections etc. The design seems adequately powered with a .45, a gentle responsive machine in the air. It will handle reasonable wave conditions, but cutting through choppy waves can throw spray into the prop. This breaks tips off wooden props under certain conditions. Nylon props are advisable.







The need for "up-trim" and "right-trim" seemed to show in taxi tests. Note nose-low plowing tendency. C.G. exactly 25% back, could travel aft. Upthrust will be increased if calmer seas reveal the need after trim correction. Should it still need more, a chine spray rail to deflect bow wave can be added. Seaplanes always need careful trimming for water and air flight.



Airborne: via the hand-launch route if you insist on the gory details. It was getting windy so forgive us. It looks like a fine ship in the air, stable, flat, fast and furious. Needed a turn or two in the Kwick-Links for more up and right. Much lighter ship than "Scavenger" too.

That's pretty far off. Bring it down a little lower, a little closer, a little tighter, and "ka-boom". See next picture, and pass the glue.

Radio range-checked fine, but better with the prescribed vertical antenna system. Chalk up another "goof" on our part. A higher altitude might have given us more time to correct, but we didn't have it. Site was a strip of barrier beach between Sound and bay. Sea gulls own it.

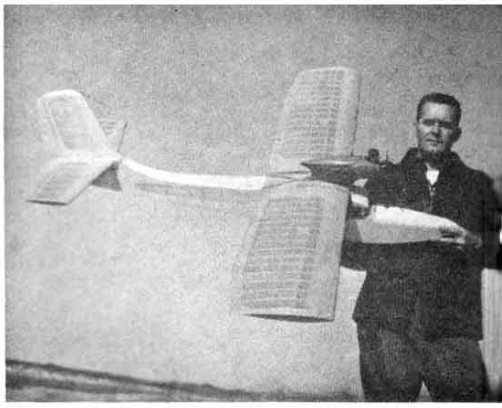
. . . continued . . .

PIRANHA'S BATH

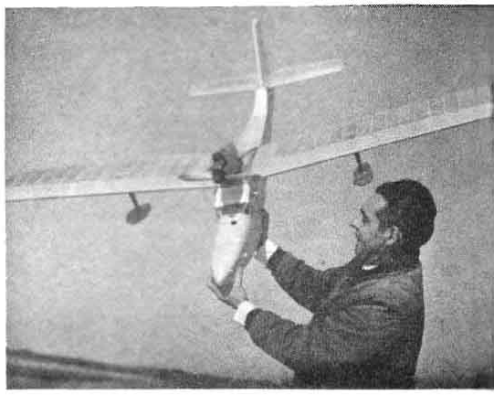
plete this aircraft due to a busy schedule, though the actual frame of the aircraft is not at all difficult. Just hard to find the time to link all together, fit the plexiglass, sand the hull and make-ready for the orange silk. Then too, the weather hereabouts is against us, time is early November, temperatures are in the 27 degree range at night, and that makes for freezing cold seawater to say the least. Also it is a time of year when the wind shifts from off-shore (calm water) to on-shore with stupendous wave effects if you pick even a moderate breeze. Thus we'll aim for whatever cove or bay provides a lee shoreline for initial flight attempts.

The "Piranha" floats just as we hoped, on its wing floats with almost no list to either side. A cross-wind striking one side of the aircraft will tilt the model slightly with the opposite float going deeper in the water, but this is a normal reaction to the force of the wind. The wing floats have sufficient buoyancy to balance the craft under all normal conditions to be encountered. Minor adjustments can be made by trimming the hardwood strut length at the sheer-plate break position. Floats should just lightly contact the water for test flights, and may be further trimmed shorter in some cases, 1/16" at a time. Don't overdo. They should be as short as possible, yet allow you to keep model balanced for take-offs. Particularly important if it lists far out in distant water where your vision will not give you a clear indication of the take-off attitude. Note the wing floats are set in mid-wing, actually nearer to the hull than a scale-like position would be. This effectively reduces the pulling tendencies they can create to alter the model from its intended straight course. Further, they are made to tear loose on any harder wave impacts, splintering the ply sheer plates which are instantly replaceable with a rubber band. Offers 360 degree shock travel without damage to the wing.

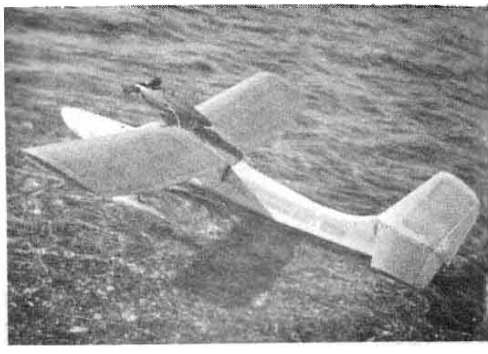
(Continued on Page 40)



November day dawned 20 degrees. Gene refused to swim after it. Light winds 5 to 15 knots, which sort of made us hurry the deal somewhat.



William Aarts poses the "Piranha". Decals and trim still to be added. Only half-doped too. A large airframe, roomy, ample wing area helps.



Citizen-Ship "Digital" using three servos, rudder, elevator, engine.

PIRANHA

(Continued from Page 12)

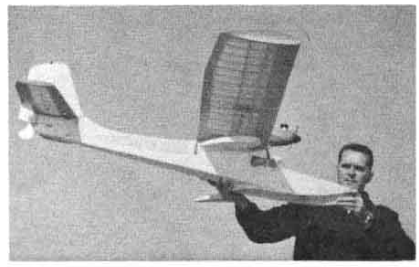
The reason we dwell at length on the wing float setting is that if they are improperly positioned, their effect on the take-off ability is quite great. Set too deep in the water, these wing floats will create their own little bow wave which in the case of the left float may reach as high as the bottom camber of the wing. (Torque effect.) All this is plain ordinary drag to the model, retarding acceleration severely. Watch these floats, if they seem to be actively dragging in the water, trim the strut length and try again. A small model saw in the tool kit will handle this task even out in a boat.

Actually if you could stabilize a model such as this without these wing floats, as if the model was hand-shoved to a speed where it would balance itself for flight, it would break-free far sooner. Even obstructions on the side of the fuselage such as dummy wheels and fairings which would collide with any part of the bow wave will nullify take-off, or certainly retard it. Still, they are not all that critical, and any reasonably close setting will give you excellent take-offs with no trouble.

With the incidence settings shown, a faint degree of washout trimmed into the ribs, a 25% balance point maintained, and properly mounted wing floats, the "Piranha" will float in a super-stable manner under almost all reasonable wind conditions, up to whitecaps. In winds which you would enjoy flying in, say under 12 mph, the model should not upset on take-off or touchdown, as long as it is landed into the wind. Even downwind and crosswind landings are usually possible unless waves are high as on open bodies of water. In such cases you might collide downwind with a wave, which can destroy the aircraft as if it hit a stone wall. In one such case an earlier 7-footer we flew slammed into a wall of water in a normal but downwind approach, and tore the entire leading edge, sheeting and all off the wing, from tip to tip, and back to the second spar. The wing was totalled, though no fuselage or float damage.

The wing loading of the "Piranha" is not so high that you cannot hand-launch it for a test glide off the beach, into the water. This is not too important however on a radio craft of this nature, but if you would like to, be our guest. It would be best for just the first attempt to remove the tip floats. It will skim in on the bow, deflecting upward until the entire hull contacts the water, then it will coast to a halt and lean a wingtip into the juice.

Try it next with the wing floats attached, lightly bound with rubber. It should land in like manner, without the wingtip dipping in. This at least will give you a good idea of the desired approach angle for a good landing. The model has a 4 degree incidence setting in the wing, in relation to the bottom forward hull keel line. 3 degrees in the stab, which gives 1 degree positive incidence between wing and stab. A trifle more lift than some zero-zero multi settings, therefore a trifle more subject to ballooning, with high power. This extra life will work to your advantage on the take-off run, as it lightens the model in the water, and lets it fly off smoothly with less of the violent upward surge common to model seaplanes. If the trim feels wrong to you in flight, and it will vary with individual warps, loading, experience in trimming, power available, thrust settings and prop pitch, shim the incidence accordingly. Make these adjustments in the stabilizer incidence only. This hull design requires a 4 degree wing angle at the datum line of the airfoil.



Trimmed out, in level flight, the hull bow appears to be nose low. It will glide in on approach at this nose-low angle, the bow keel first contacting the water about 7" back from the tip of the nose. It will land safely without any up-elevator flare-out in calm sea conditions, but a trifle short of gracefully. By flaring out as you would any landing aircraft, that is levelling off from the descent angle and holding the ship as long as possible about 12" above the water, cranking in more and more up-elevator, you will make a far more perfect landing. The trick is to play with the elevator applied, so that the model levels off, but does not balloon at all upwards. If it starts to, slackens the stick, then catch it and feel it onto the water. You can't really miss, as the "Piranha" will land perfectly even if you already drowned ten minutes ago, but the ability to flare it, hold it airborne till the model slows and slides onto the surface makes you the master of the situation.

Take-off attitude: Sit the "Piranha" in the water. (We know it's frozen solid now, it's winter, etc., so don't write in. It will melt again by the time you get it built, which is why we ran the ship in the December issue.) Take a good gawk at it as seen from the side-view. Virtually the entire hull is in contact with the water, save the bow sweep. This is the angle it will taxi at in low speed, at high speed, and at lift-off. As speed increases, the wing will lift the ship higher, and take-off will be accomplished with the aft center keel parallel to the water surface. It is an N.A.C.A. Long Planing Hull, and is designed to plane on the afterbody, (aft of step) not the forebody

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PIRANHA

(Continued from Page 40)

of the floats as common to full scale "Edo" type float designs. If you find you're up to flying speed, but won't come unglued from the water, crank in a blast of "up-elevator," and you're in the air.

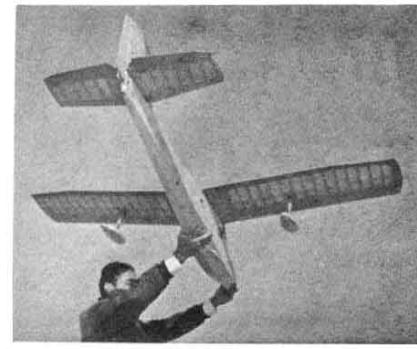
The original shows great potential, though at this writing it is still in need of minor trim as on any new design. In general it handles much like our earlier "Scavenger" design, being quite similar in general layout and size. This is an easier ship to build, lighter and holds greater performance potential. It is not a tricky bird in any way, but we're still nervously trying it out as winter settles upon the Sound. A few random thoughts to help:

Linkages: The "All Dry Canister" design in this issue effectively solves the radio installation, while the plans in the December issue display the airframe. The normal pushrods and horns will have to be installed to connect the servo throw to the rudder, elevator and engine.

1" nylon horns are recommended, and usually are available with a choice of hole positions. We recommend you start with the hole furthest from the base to decrease sensitivity for initial flights. Also, it requires the least amount of thrust from your servo should it be in marginal shape.

A yard length of 3/16" dowel will

1,500 square miles of water, so what does it hit? The stupid ground, that's what. Soft sand fortunately. Buzzing low for better photos at the time. We think the horizontal temporary antenna was to blame. Note how floats shear off. Damage was very slight, crack in wing sheeting.



bridge the distance from the R/C "Canister" to the proximity of the tail surfaces. 1/16" dia. wire and nylon "Quick-Links" extend from the terminal end of the dowel pushrods to the actual rudder and elevator horns. These avoid the metal to metal contact that often result in electrical noise or interference to your equipment.

On the "Canister" end, 1/16" dia. piano wire equipped with wire keepers attach to the balloon shrouded tubing exiting from the servos within. Bind and cement the wire to the dowels at the appropriate position as is standard practice on most R/C installations. Make sure all pushrods are free to travel without binding etc. Nylon hinges require a certain degree of thrust from your servos, but usually this is well within the power potential of the servos, unless you use more than the normal amount of hinges. A maximum of about 3/4" wide nylon hinges are advised for the elevator, and three for the rudder.

The linkage from engine speed to the servo in the "Canister" is a little sticky. Our servo was located in the front end of the box with a flexible cable looping around in a "U" shape to reverse its direction back through the cabin and up to the nacelle. This leaves something to be desired in servicability, as the wing is then attached to the flex cable etc. Still fooling around with this ourselves, with a bellcrank at the forward end of the "Canister" offering more convenient disconnect point for wing removal. Build with this problem in mind, there are better solutions if you plan ahead. We've been too busy on a dozen other design points to give this our full attention until after these test flights.

Flying: Pick calm weather for initial tests. Make a few running glide tests, heaving it out off a beach into the water. (Wait till the ice melts.) Water is a bit more forgiving than land, so you should fair pretty well. Add incidence shims, shift balance etc. as indicated by the glide performance.

When the ship is all in order, aligned, checked and fueled, start the engine, run it up to about medium power, and hand-launch. If you have the services of a power boat, launch with the boat at top or near top speed. It works very nicely, as you can feel the lift developed and add or detract from it at the instant of launch. A 15 horse outboard on a 14 foot hull, a 35 horse on a 16 footer, 100 horse in a 20 footer etc. will give you the kind of performance that will match the flight of the "Piranha". Settle for anything that floats however, you can't have everything.

Once in the air, the performance is much the same as any land aircraft. It will respond well, and fly in a sane manner if all is built with care. The ship was not designed with an eye toward flying the Stunt pattern, but it will do fairly well.

Take-offs from the water will be improved with the addition of a water rudder for steering at slow speeds when the air rudder is not effective. This is attached to the air rudder. Swing the model into the wind and go wide open with the .45 for the take-off. (Reduce power when airborne.) This is a "Long Planing Hull" type, which planes on the after-body, not the area forward of the step. It should break loose after about 200 feet of take-off run. Maybe more, maybe less, depending on the shape of your engine.

The landings on water are a sight to see. Throttle back and let the "Piranha" descend as you would any other multi, flaring out with a touch of elevator just above the water. Have a camera on hand or you'll be kicking yourself.

Mooring: Nothing can be more annoying than a couple of pesty kids at the beach. The kind that stand too close, kick sand and end up falling on top of it. At times it can be a big convenience to anchor the ship a few yards offshore. One simple screw eye in the nose block does the job, and "Piranha" will ride the wind perfectly, feathered into the wind at all times. A small float of any kind will suffice for a mooring block, which will float as a marker while the aircraft is elsewhere. A brick or equivilant weight will suffice on the bottom of the pond.

At days end: Dry it out. Spill any bilge out of the hull, drain any moisture which might have collected in the wing or stab tips etc. The small pin holes at the trailing edge will allow these few drops to dribble out if the aircraft is angled accordingly. Run your engine dry on the beach, then allow to cool, squirt exterior with fuel and oil it later. Particularly important if you are flying off salt water. Lubricate any metal which is prone to rust.

At home: We suggest you remove the R/C "Canister" from the aircraft and expose to a little sunlight etc. The reason for this is that a damp airframe is the wrong environment for your equipment no matter how well packaged the radio is. Salt water leaves a faint deposit of salt on a model which absorbs moisture from the air. It remains wet even a year later. It just sits on the covering and hurts nothing, so worry not. Hope the design adds fun to your summer season. ●